XX. *The Protective Resemblance to flowers borne by an African Homopterous Insect,* Flata nigrocincta, Walker. By Sidney Langford Hinde. Communicated by Prof. Edward B. Poulton, M.A., D.Sc., F.R.S.

[Read June 4th, 1902.]

Plates XXVI and XXVII.

The "cluster of insects grouped to resemble a flower spike" which forms the frontispiece of Professor J. W. Gregory's "Great Rift Valley" (London, 1896) has attracted much attention and interest, as well as a certain amount of criticism. As I have had many opportunities of seeing the insect, and still oftener its larvæ, in the wild state, in British East Africa, and have drawings of both *in situ* made upon the spot by my wife, it seems desirable to publish the evidence.

Professor Gregory's plate was apparently drawn in England from his description and the dried specimens. In the insects grouped on the vertical stem the green individuals occupying the uppermost position (Fig. 1) are represented as considerably smaller than the red ones below, like the unopened green buds towards the top of a flowering spike as compared with the expanded blossoms below. On the other hand, the separate representations of the green (Fig. 3) and red forms (Fig. 2) of the insect, as well as the description on pages 273–275 of the work, indicate that there is no difference in size between the two. My own experience entirely confirms this latter conclusion, and there is no doubt that the impression conveyed by Fig. 1 is in this respect erroneous. Furthermore, the uniform deep pink colour of the exposed parts of the insects represented in Figs. 1 and 2 of the frontispiece is incorrect. The colours of the red forms of the living insect are as shown on the accompanying Plate XXVI, being of a bright orange-red anteriorly passing into a reddish-orange over the remainder of the surface exposed in the attitude of rest.

Furthermore, I have never seen the insects grouped according to their colours, but invariably mixed; I have

never seen the larvæ and imagines on the same stem or even together on the same tree or bush. I have never seen the imagines on vertical stems, but always on those which are actually or approximately horizontal.

It does not by any means follow that Professor Gregory was mistaken in his impressions, but it is certain that conditions other than those which he records are common. The discrepancy is not, however, to be explained by the hypothesis that I have been observing one species and Professor Gregory another. My material has been compared with that of Professor Gregory in the British Museum of Natural History by Professor Poulton, and he states both sets of specimens certainly belong to the same species, viz. a form slightly different from *Flata nigrocincta* (Walker), but evidently closely allied and perhaps specifically identical with it.

One criticism of Professor Gregory's plate and description we cannot sustain. I understand that the experienced African naturalist, Mr. W. L. Distant, holds that the position shown in Professor Gregory's Fig. 1 was merely due to the heavy rain which is stated to have occurred at the time (*loc. cit.*, p. 273), the insects having crept up the vertical stem to as great a height as possible in order to escape the wet. Mr. Distant accordingly believes that their grouping is unconnected with any protective resemblance to an inflorescence. My wife and I, on the other hand, recognize a strong superficial likeness between the mixed groups of insects and the flowers and buds of a leguminous plant with which we are perfectly familiar. We have mistaken the groups of insects for the flowers, and conversely the flowers for the insects. We unfortunately omitted to bring a piece of the plant to England in order that it may be identified, but this omission can easily be rectified on our return to East Africa.

Although, as I have said, we have never seen the imagines on vertical stems, the groups of larvæ were generally, although not always, in this position, as may be seen on Plate XXVII, reproduced about two-thirds of the natural size from a drawing made and finished upon the spot by Mrs. Hinde (Jan. 20, 1901). The locality was an island in the Athi River near the "Falls," about twenty-three miles from Kitui Station. There were dozens of groups on the shrubs and small trees under the shade of large trees on the island, and the group painted—a small

one—was that which was most convenient in position, about four feet from the ground. The long wax filaments so easily break that it was impossible to obtain satisfactory results by painting the captured larvæ.

The drawing of the imagines was made Jan. 23, 1901, at Kitui Station, from a branch of a bush which was covered with groups and single insects, although in both larvæ and imagines these latter are rare as compared with groups. The bush, which was small, was about fifteen feet high and ten feet in diameter.

When disturbed the imagines fly and the larvæ hop a short distance in any direction, but they soon begin to collect in groups again: the larvæ will have reformed into small groups in half-an-hour. The larvæ are often seen on rotten wood and dead leaves, but this is probably after they have been disturbed. Frequently too, I have seen the waxy secretion left adhering to branches where they have been. The larvæ seem to prefer a moist atmosphere and shade, although I have seen them in the broadest sunshine at Kibwezi, the locality where the insects were seen by Professor Gregory. The imagines I have observed in numbers on three or four occasions and in single groups several times. The groups of larvæ are usually about three or four inches in length, but I have seen a group as much as two feet long.

The larvæ towards the growing end of a branch are the smallest of the group (see Plate XXVII), and Professor Poulton suggests that this observation may perhaps reconcile Professor Gregory's account with ours. Professor Gregory, indeed, considers that the eggs of the *Flata* are laid from below upwards so that the insects towards the top of the stem would be the younger, and he thinks possibly immature (*loc. cit.*, p. 275). But the difference in colour cannot be due to immaturity, for we have found old, worn specimens of the green form. The first to emerge of any group may, however, be green, and those that emerge later red; and Professor Gregory may have come across undisturbed groups which therefore were green above and red below. Our groups, on the other hand, may have reassembled, and thus have lost the arrangement which it is possible they may have possessed on emergence from the pupal state. Specimens of larvæ and imagines captured at the time when the sketches were made were sent by us to the Hope Collection at Oxford.

Explanation of Plate XXVI.

Protective Resemblance to flowers of British East African Flata nigrocincta (Walk.).

About $\frac{2}{3}$ of the natural size.

The sketch was made by Mrs. S. L. Hinde at Kitui on Jan. 23, 1901, and represents an actual group painted *in situ*. A red and a green form of imago are shown separately with their wings expanded. The Plate is a three-colour reproduction of the original painting.

Explanation of Plate XXVII.

Larvæ of British East African Flata nigrocincta (Walk.).

About $\frac{2}{3}$ of the natural size.

The plate is a half-tone reproduction of Mrs. S. L. Hinde's original sketch made from the larvæ in the natural position, on an island in the Athi River near Kitui, on January 20, 1901. The two larvæ which are figured separately from the group were sketched in order to show the curiously different curves of the waxy filaments in two individuals.